

REMARKS

Claims 1-31 are pending in the application. Claims 16 and 19 were amended to solely correct typographical errors. For at least the reasons set forth below, withdrawal of all outstanding rejections as they relate to the amended claims is respectfully requested.

Specification Objections

The specification was amended to correct the reference numbers on page 10, lines 5-6 of the current specification.

Claim Objections

Claims 16 and 19 were amended to correct minor typographical errors.

Prior Art Rejections

1. Claims 1-15 and 26-31 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,566,715 (Ker, et al.), hereinafter "Ker '715." The Applicants respectfully traverse the rejection.

1. Patentability of independent claims 1 and 26 over Ker '715

The Examiner asserts that Figs. 5B, 6, 9, 11; column 4, lines 6-64; and column 6, line 60 to column 7, line 13 of Ker '715 disclose all of the features recited in independent claim 1.

The Examiner also asserts that Figs. 5B, 6, 9, 11; and column 4, line 10 to column 7, line 25 of Ker '715 disclose all of the features recited in independent claim 26. Claims 1 and 26 read as follows (underlining added for emphasis):

1. A semiconductor device suitable for applications in an electrostatic discharge (ESD) protection circuit, comprising:
a semiconductor substrate;
a first well formed in the substrate;
a second well formed in the substrate; and
a first doped region formed in the second well,
wherein the first well, the second well, and the first doped region collectively form a parasitic bipolar junction transistor (BJT), and
wherein the first well is the collector of the BJT, the second well is the base of the BJT, and the first doped region is the emitter of the BJT.

26. A semiconductor device suitable for applications in an electrostatic discharge (ESD) protection circuit, comprising:
a semiconductor substrate;
a first well formed in the substrate;
a second well formed in the substrate;
a third well formed in the substrate;
a first doped region formed in the second well; and
a second doped region formed in the second well,
wherein the first well, the second well, and the first doped region collectively form a first parasitic bipolar junction transistor (BJT), and the second well, the third well, and the second doped region collectively form a second parasitic BJT, and wherein the first well is the emitter of the first BJT, the third well is the emitter of the second BJT, the second well is the base of both of the first and the second BJTs, the first doped region is the collector the first BJT, and the second doped region is the collector of the second BJT.

Fig. 5B of Ker '715 is a cross-sectional view of a substrate-triggered NMOS device and shows how two BJT's are formed within the substrate. As described in column 4, lines 31-34 of Ker '715, the leftmost BJT is formed as follows:

1. emitter: leftmost n+ doped region 38
2. base: p-well 32
3. collector: leftmost n+ doped region 36

As also described in column 4, lines 31-34 of Ker '715, the rightmost BJT is formed as follows:

1. emitter: rightmost n+ doped region 38
2. base: p-well 32
3. collector: rightmost n+ doped region 36

None of the emitters or collectors in Fig. 5B of Ker '715 are wells.

In contrast to Ker '715, claims 1 and 26 both recite forming BJT's wherein either the collector (claim 1) or the emitters (claim 26) are wells. See, for example, Fig. 1 of the present invention wherein N-well 306 is the collector.

In the outstanding Office Action, the Examiner states that the N-wells 44 in Fig. 5B of Ker '715 are used to form a BJT. The Examiner also states that the leftmost N-well 44 act as the

collector of the BJT with respect to claim 1, and that the leftmost and rightmost N-wells 44 act as the emitters of the two BJTs with respect to claim 26. Both of these statements are incorrect. The N-wells 44 are not used to form BJTs. Instead, they are merely electrically coupled to emitters of BJTs as clearly described in column 4, lines 35-36 of Ker '417. The BJTs in Fig. 5 of Ker '715 are formed by the parts discussed above, none of which include the N-wells 44. Furthermore, the fact that the N-wells 44 are electrically coupled to emitters of a BJT does not mean that the emitters of the BJTs are formed by the N-wells. In fact, the BJTs would still be functional devices even without the N-wells 44 being electrically coupled to their respective emitters.

For at least the reasons set forth above, claims 1 and 26 are believed to be patentable over Ker '715.

3. Patentability of dependent claims

The dependent claims are believed to be patentable over Ker '715 for at least the reason that they are dependent upon allowable base claims and because they recite additional patentable elements and steps.

Allowable Subject Matter

1. Claims 16 and 19 were rewritten to correct the minor errors as set forth above and are now in condition for allowability.

2. Claims 17-22 and 25 are dependent on claim 15 that is dependent on claim 1, in which claim 1 is now believed to be patentable over Ker '715 for at least the reasons discussed above, and thus making claims 17-22 and 25 allowable.

3. Claims 23 and 24 are dependent on claim 16, which is allowable after correcting minor errors as described above, and thus making claims 23 and 24 allowable.

Conclusion

Insofar as the Examiner's rejections were fully addressed, the instant application including claims 1-31 is in condition for allowance. A Notice of Allowability of all examined claims is therefore earnestly solicited.

Respectfully submitted,
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January 17, 2006
(Date)

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